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NOTES ON GEOGRAPHIC DISTRIBUTION

First confirmed record of *Harmonia axyridis* (Pallas, 1773) (Coleoptera: Coccinellidae) in the state of Mato Grosso do Sul, Brazil

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ABSTRACT: *Harmonia axyridis* is a predator of aphids and other soft-bodied insects. This coccinellid, native to Asia, has invaded North America, Europe, South America and Africa. We report the first detection of *H. axyridis* in the Brazilian state of Mato Grosso do Sul, and review its current known geographic distribution in Brazil. Based on experiences from other parts of the world already invaded by *H. axyridis*, recommendations are provided to maximize the potential benefits offered by this species, while minimizing the potential adverse impacts that it can cause.

Harmonia axyridis (Pallas, 1773) is commonly referred to as the multicolored Asian lady beetle. Descriptions of the larval and adult stages can be found in Koch (2003). *Harmonia axyridis* is considered semi-arboreal and feeds primarily on Aphididae, but will also readily feed on Psyllidae, Coccoidae, Tetranychidae, immature stages of Coleoptera and Lepidoptera, and plant materials (*e.g.*, pollen and fruits) (Koch 2003).

This insect has been documented having both positive and negative impacts. Being a voracious predator, *H. axyridis* contributes to the control of pests in a variety of production systems (Koch 2003). In other situations, *H. axyridis* can become a pest. It has been documented as a nuisance household invader that can cause allergies in people; as a pest of fruit and wine production; and as a threat to biodiversity (Koch and Galvan 2008).

This insect is native to Asia and has invaded North America, Europe, South America and Africa (Koch 2003; Koch *et al.* 2006b). Classical biological control programs and accidental introductions via international commerce have likely contributed to the worldwide spread of this organism (Koch 2003). Molecular and historical data suggest that populations of *H. axyridis* in North America stemmed directly from native Asian populations; that the populations in South America and Africa came from established North American populations instead of directly from native Asian populations; and that the populations in Europe came both from native Asian and established North American populations (Lombaert *et al.* 2010).

In South America in particular, established populations of *H. axyridis* were detected in Buenos Aires, Argentina in 2001, and later in Curitiba, Brazil in 2002 (Almeida and Silva 2002). Koch *et al.* (2006b) qualitatively evaluated the likelihood of this species invading other parts of South America. After evaluating factors associated with the arrival, establishment and spread of *H. axyridis* in South America, the authors concluded that continued invasion of broad areas of South America was likely (Koch *et al.* 2006b). These predictions were corroborated by climate matching analyses conducted by Poutsma *et al.* (2006). Subsequently, *H. axyridis* was reported from Chile, Peru, Paraguay (Grez *et al.* 2010) and Uruguay (Ribeiro and Castiglioni 2008). In Brazil, the distribution of *H. axyridis* is known to include the states of Rio Grande do Sul, Santa Catarina, Paraná, São Paulo, Rio de Janeiro and Minas Gerais, and the Distrito Federal (Table 1).

We found no published record of *H. axyridis* occurring in the state of Mato Grosso do Sul, Brazil. With this article, we report the detection of *H. axyridis* in the state of Mato Grosso do Sul. On 25 February 2011, three adult *H. axyridis* were found as unidentified Coccinellidae in the entomological collection of the Universidade Federal da Grande Dourados. Two of the specimens were collected via pitfall traps on 20 October 2010 in Dourados, Mato Grosso do Sul, Brazil (22°11'49.5" S, 54°55'59.1" W; altitude: 461 m). The third specimen was collected via active search on 19 January 2011 in Dourados, Mato Grosso do Sul, Brazil (22°12'36.28" S, 54°48'38.40" W; altitude: 422 m). The identity of these specimens was confirmed by Natalia Vandenberg (Systematic Entomology Laboratory, United States Department of Agriculture). These adults, with an orange ground color and variable number of black spots, belong to the succinea color form of *H. axyridis*. These specimens are maintained in the entomological collection of the Universidade Federal da Grande Dourados.

Because *H. axyridis* is likely to become a permanent component of the fauna of Mato Grosso do Sul and other parts of Brazil, the following recommendations of Koch *et al.* (2006b) should be considered. "We must continue to advance our knowledge on how to reap benefits in situations where *H. axyridis* is a potential biological control agent and mitigate its effects in situations where it is a potential pest (*e.g.*, as a household pest, pest of fruit production and threat to non-target organisms)" (Koch *et al.* 2006b). Since *H. axyridis* is an effective predator of various pests, it should be incorporated into integrated pest

Table 1. Documented distribution of *Harmonia axyridis* in Brazil.

CITY	STATE	YEAR DETECTED	REFERENCE
Curitiba	Paraná	2002	Almeida and Silva 2002; Martins, unpublished data
Ponta Grossa	Paraná	--	Milléo *et al.* 2008; Martins, unpublished data
Araucária	Paraná	--	Zawadneak *et al.* 2008
Guaratuba	Paraná	--	Martins, unpublished data
Piracicaba	São Paulo	2004	Arruda Filho *et al.* 2009
Andradina	São Paulo	--	Martins, unpublished data
Viçosa	Minas Gerais	2006	Rezende *et al.* 2010; Martins, unpublished data
Caçador	Santa Catarina	--	Santos and Gonçalves 2009
Itaiópolis	Santa Catarina	--	Martins, unpublished data
Xanxerê	Santa Catarina	--	Martins, unpublished data
Camboriú	Santa Catarina	--	Martins, unpublished data
Passo Fundo	Rio Grande do Sul	--	Martins, unpublished data
Seropédica	Rio de Janeiro	2006	Resende *et al.* 2009
Brasília	Distrito Federal	2009	Martins *et al.* 2009
Dourados	Mato Grosso do Sul	2010	Present study

management programs to promote the pest suppression offered by this predator (*e.g.*, Galvan *et al.* 2005; Koch *et al.* 2006a). In contrast, continued work is needed to monitor for potential adverse effects of this species and to mitigate such effects if they occur. To date, we are not aware of this insect acting as a household nuisance pest or as a pest of fruit or wine production in Brazil. However, *H. axyridis* may already be impacting biodiversity in Brazil. Populations of native and established Coccinellidae appear to have decreased in areas invaded by *H. axyridis* (Milléo *et al.* 2008; Martins *et al.* 2009). This pattern is similar to that observed with some North American Coccinellidae after the invasion of *H. axyridis* (Koch and Galvan 2008). Because of the potential for impacts on biodiversity, caution should be taken when trying to promote populations of this predator for biological control.

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